

## **(R – 9) - GLOSSARY**

**A**cequia: Historical community ditch, found throughout the state but predominantly in the mountainous areas of Northern New Mexico.

Agronomy: The science of utilizing plants for food, fuel, feed, and fiber.

Anion: Negatively-charged particle.

Application efficiency ( $E_a$ ): The ratio of the average depth of irrigation water infiltrated and stored in the root zone to the average depth of water applied, expressed as a percentage - also referred to as AE.

Application rate: Term generally used in sprinkler irrigation to describe the rate at water is applied to a given area - usually expressed in inches per hour.

Available soil water: The difference between actual water content of a soil and the water held by the soil at permanent wilting point.

Available water capacity (AWC): The portion of water in the soil profile that can be readily absorbed by plant roots of most crops, expressed in inches per inch, inches per foot, or total inches for the specified soil depth. It is the amount of water stored in the soil between field capacity (FC) and permanent wilting point (WP). It also called available water holding capacity (AWHC).

**B**laney-Criddle Method: An air temperature based method to estimate crop Evapotranspiration.

Bulk density: Mass of dry soil per unit volume, determined by drying to a constant weight at 105° C, usually expressed as gm/cc or lb/ft<sup>3</sup>.

**C**ation exchange capacity (CEC): The sum of exchangeable cations (usually Ca, Mg, K, Na, Al, H) that the soil constituent or other material can absorb at a specific pH. Usually expressed in milli equivalents (meq) per 100 grams of soil at neutrality (pH=7.0).

Cation: Positively charged particle.

Chemigation: Application of chemicals to crops through an irrigation system by mixing them with irrigation water.

Conservation crop rotation: Growing crops in a recurring rotation on the same field to maintain or improve soil organic matter, reduce water and wind erosion, select crops for irrigation water management or salinity management, manage nutrients and pests, provide food for domestic livestock, and provide food and cover for wildlife.

Conservation management system: A system which addresses soil, water, air, plant, and animal resource concerns.

Consumptive use: See Evapotranspiration.

Crop coefficient ( $K_c$ ): A factor used to modify potential evapotranspiration as follows: (1) Ratio between crop evapotranspiration ( $E_t$ ) and the reference crop ( $E_{T_o}$ ) when the crop is grown in large fields under optimum growing conditions ( $E_t = K_c \times E_{T_o}$ ), or (2) the ration of the actual crop Evapotranspiration to its potential Evapotranspiration.

**D**enitrification: Process occurring naturally in soil, where bacteria break down nitrates to give nitrogen gas, which returns to the atmosphere.

Distribution uniformity (DU): The measure of the uniformity of irrigation water over a field. NRCS typically uses DU of the lower one-quarter which is the ration of the average of the lowest one-fourth of measurements of irrigation water infiltrated to the average depth of water infiltrated, expressed as a decimal. Each value represents and equal area.

**E**lectrical conductivity (EC): A measure of the ability of the soil water to transfer an electrical charge. It is used as an indicator for the estimation of salt concentration, measured in mmhos/cm (dS/m at 77°F (25°C)).

Electrical resistance blocks: A block made of various material containing electrical contact wires that is placed in the soils at selected depths to measure soil moisture content. Electrical resistance, as affected by moisture in the block, is read with a meter.

Energy: The capacity of a physical system to perform work.

Evapotranspiration (ET): The combination of water transpired from vegetation and evaporated from soil and plant surfaces - sometimes called consumptive use (CU).

**F**ield capacity: The amount of water retained by a soil after it has been saturated and has drained freely by gravity. It can be expressed as inches, inches per inch, bars suction, or percent of total available water.

Flood irrigation, wild flooding: A surface irrigation system where water is applied to the soil surface without flow controls, such as furrows, borders (including dikes), or corrugations.

Furrow irrigation: A surface irrigation system where water is applied to small channels or furrows to guide water down slope and prevent cross flow - called rill or corrugation irrigation in some areas.

**G**ravitational water: Soil water that moves into, through, or out of the soil under the influence of gravity.

**H**iflow turnout: A field turnout structure that delivers a high rate of water, typically up to 20 cfs. The idea is to deliver water across the field in the minimum amount of time in order to have similar opportunity time across the entire filed. Laser leveled fields are essential.

**I**nfiltration, infiltration rate: The downward flow of water into the soil at the air-soil interface. The rate at which water enters soil is called intake rate or infiltration rate.

Irrigation efficiency ( $E_i$ ): The ration of the average depth of irrigation water beneficially used to the average depth applied, expressed as a percentage. It includes satisfying the soil water deficit, leaching requirement for salinity control, and meeting other plant needs - generally used to express overall field or farm efficiency, or seasonal irrigation efficiency.

Irrigation water management (IWM): Managing water resources (precipitation, applied irrigation water, humidity) to optimize water use by the plant. Soil and plant resources must be considered.

**L**aser leveling: Shaping of the surface of the soil to planned elevations and grades with the use of laser controlled leveling equipment.

Leaching fraction: The ratio of the depth of subsurface drainage water (deep percolation) to the depth of infiltrated irrigation water - determined by the leaching requirement.

**Legume:** A legume is any of the thousands of plant species in the legume family, *Leguminosae*. Legumes have seed pods that, when ripe, split along both sides. Beans, lentils, peanuts, peas, and soybeans are some of the common legumes consumed by humans

**LEPA:** Low energy precision application. A soil, water, and plant management regime where precision down-in-crop application of water is made on the soil surface at the point of use. Application devices are located in the crop canopy on drop tubes mounted on low pressure center pivot or linear move sprinkler irrigation systems - generally limited to circular plantings on less than 1% slopes and no translocation of applied water. Furrow dikes, good soil condition, and crop residue are usually required to control water translocation.

**LPIC:** A low pressure in-canopy system that may or may not include a complete soil, water, and plant management regime as required by LEPA. Application devices are located in the crop canopy with drop tubes mounted on low pressure center pivot or linear move systems. Limited water translocation within the field and some minor non-uniformity of water application usually exists.

**MAD:** Management allowed depletion is the planned soil moisture deficit at the time of irrigation. It can be expressed as the percentage of available soil water capacity or as a depth of water that has been depleted from the root zone.

**Measuring:** The process of determining the amount of water used with the focus being on managing the use.

**Metering:** The process of measuring water with the legal implications of reporting use.

**Microirrigation:** The frequent application of small quantities of water as drops, tiny streams, or miniature spray through emitters or applicators placed along a water delivery line (tubing). The microirrigation method encompasses a number of systems or concepts, such as bubbler, drip, trickle, line source, mist, or spray.

**Net irrigation:** The actual amount of applied water stored in the soil for plant use or moved through the soil for leaching salts. Also includes water applied for crop quality and temperature modification. Application losses, such as evaporation, runoff, and deep percolation are not included - generally measured in inches of water depth applied.

**Nutrient management:** Managing the application rate, method, and timing of fertilizers and soil amendments, including manure, to optimize crop use and reduce pollution of ground and surface water.

**Organic Matter:** Soil organic matter consists of a variety of components. These include, in varying proportions and many intermediate stages: raw plant residues and microorganisms (1 to 10 per cent), "active" organic fraction (10 to 40 per cent), and resistant or stable organic matter (40 to 60 per cent) also referred to as humus.

**Pan coefficient:** A factor to relate actual evapotranspiration of a crop to the rate water evaporates from a free water surface in a shallow pan. The coefficient usually changes by crop growth stage.

**Pest Management:** Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals, and other organisms, that directly or indirectly cause damage or annoyance.

**Petiole:** The stalk of a leaf, attaching the blade to the stem.

**pH:** A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity. The pH scale commonly in use ranges from 0 to 14.

**Power:** The time rate at which work is done or energy is transferred.

**PPM:** Parts per million

**PWP:** Permanent wilting point. The moisture percentage, on a dry weight basis, at which a plant can no longer obtain sufficient moisture from the soil to satisfy water requirements resulting in a dead plant. Classically, 15 atmospheres soil moisture tension is used to estimate PWP.

**R**eplogle flume: Also known as a ramp flume. A modified broad-crested weir located in a short flume, lined ditch, or pipeline that causes a drop in the hydraulic grade line, for measuring water flow rates. With open channel flow, there is one critical surface, which is level. Very little head loss is required to accurately measure water.

**Root zone:** Depth of soil that plant roots readily penetrate and in which predominant root activity occurs.

**S**aline soil: A non-sodic soil containing sufficient soluble salts to impair its productivity for growing most crops. The electrical conductivity ( $EC_e$ ) of the saturation extract is greater than 4 mmhos/cm. and the exchangeable sodium percentage (ESP) is less than 15; i.e., non-sodic. The principle ions are chloride, sulfate, small amounts of bicarbonate, and occasionally some nitrate. Sensitive plants are affected at lower salinity and tolerant plants are not affected until the salinity is higher.

**Saline-sodic soil:** Soil containing both sufficient soluble salts and exchangeable sodium to interfere with the growth of most crops. The electrical conductivity ( $EC_e$ ) of the saturation extract is greater than 4 mmhos/cm. and the exchangeable sodium percentage (ESP) is greater than or equal to 15. This soil is difficult to leach because the clay colloids are dispersed.

**Salinity:** The concentration of dissolved mineral salt in water and soil on a unit volume or weight basis.

**SAR:** Sodium adsorption ratio. A relation between soluble sodium and soluble divalent cations that can be used to predict the exchangeable sodium percentage (ESP) of soil equilibrated with a given solution defined as follows:  $SAR = Na / ((Ca + Mg) / 2)^{1/2}$ . Na is sodium, Ca is calcium, and Mg is magnesium. Concentrations are expressed in moles per liter.

**SAR, adjusted:** Also shown as “Adj. RNa”. The sodium adsorption ratio of water adjusted for the precipitation or dissolution of  $Ca^{2+}$  and  $Mg^{2+}$  that is expected to occur where water reacts with alkaline earth carbonates within a soil. Numerically, it is obtained by multiplying the sodium adsorption ratio by the value  $(1 + 8.4 - pH_c^*)$ , where  $pH_c$  is the theoretical calculation of the pH of the water in contact with lime and in equilibrium with soil  $CO_2$ .

**SDI:** Subsurface drip irrigation. Applying irrigation water below the ground surface by using a buried perforated or porous pipe system that discharges water directly into the plant root zone. It is the predominant form of trickle/drip irrigation in New Mexico.

**Sprinkle irrigation:** Method of irrigation in which water is sprayed or sprinkled through the air to plant or ground surface. Various systems exist to include: Periodic move, fixed/solid-set, continuous/self-move, boom, center pivot, corner pivot, gun type, lateral move / linear move, portable hand move, side move, side roll, solid set / fixed set, towed, and traveler.

**Stress irrigation:** Management of irrigation water to apply less than enough water to satisfy the soil-water deficiency in the entire root zone. Preferred term is limited irrigation or deficit irrigation.

**TDS:** Total dissolved solids. The total dissolved mineral constituents of water.

**Tensiometer:** instrument, consisting of a porous cup filled with water and connected to a manometer or vacuum gauge to measure the soil-water metric potential.

**Transmissivity:** A measure of the capability of the entire thickness of an aquifer to transmit water.

**Transpiration:** The process of plant water uptake and use, beginning with absorption through the roots and ending with transpiration at the leaf surfaces.

**Trickle irrigation:** a microirrigation system (low pressure and low volume) wherein water is applied to the soil surface as drops or small streams through emitters. Preferred term is drip irrigation.

**Valve:** A device installed in conjunction with a pipeline to control flow that includes: Air relief, air vacuum / air relief, backflow prevention, ball, butterfly, check, drain, float, gate, globe, pressure relief, solenoid, vacuum relief, alfalfa, orchard, and surge.

**Volatilization:** The conversion of a chemical substance from a liquid or solid state to a gaseous or vapor state.

**WHC:** Water holding capacity. Total amount of water held in the soil between field capacity (FC) and oven dry moisture level, expressed in inches per inch, inches per foot, or total inches for a specified depth.

**Water Quality:** The biological, chemical and physical characteristics of water and its general composition. These attributes affect water's ability to sustain life and its suitability for consumption and other designated uses.

**Water table:** The upper surface of a saturated zone below the soil surface where the water is at atmospheric pressure.

**Wilting point:** See PWP or Permanent wilting point.